Forklifts and Powered Industrial Trucks

Los Alamos National Laboratory
Laboratory Implementation Requirement LIR 402-1110-01.2
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1.0 Introduction

Lessons Learned **Note:** *Click Here* for Lessons learned that may apply to the requirements contained in this Laboratory implementation requirements (LIR) document.

1.1 Background

The use of forklifts and powered industrial trucks involves certain hazards that cannot be eliminated by mechanical means but only by exercising intelligence, care, and common sense; therefore, it shall be required that only competent and careful operators who are physically and mentally fit and who are thoroughly trained shall operate the equipment and handle the loads.

The Laboratory shall require that only trained and licensed personnel operate forklifts and powered industrial trucks and that these vehicles are thoroughly maintained. These requirements are based on the following standards and documentation:

- Occupational Safety and Health Administration (OSHA), 29 CFR 1910.178;
- American National Standards Institute (ANSI)/American Society of Mechanical Engineers (ASME) Standard B56.1; and
- The Department of Energy (DOE), “Hoisting and Rigging Standard,” STD-1099-99.

The requirements in this document must be followed when operating forklifts and powered industrial trucks.

This LIR complements the expectations contained in LPR 402-00-00, “Worker Health and Safety,” Appendix 14.

Attachment 2 contains guidance for recommended major implementation criteria for self-assessment.

1.2 In This Document

2.0 Purpose and Applicability

This LIR

- states the requirements that shall be implemented for training and licensing operators and for operating, inspecting, and maintaining forklifts and powered industrial trucks at Laboratory work sites and
- shall apply to all organizations and individuals who operate forklifts and powered industrial trucks at the Laboratory.

This document supersedes Administrative Requirement 13-1 and is in effect on the date it is issued.

3.0 Definitions

3.1 Acronyms

ANSI	American National Standards Institute
AR	Administrative requirement
DOE	Department of Energy
ESH	Environment, Safety, and Health Division
ESH-5	Industrial Hygiene and Safety Group
ESH-13	Training Group
FMU	Facility management unit
LIR	Laboratory implementation requirements
LPR	Laboratory policy requirements
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Administration

3.2 Terms

Attachment—A device other than conventional forks or load backrest extension mounted permanently or removably on the elevating mechanism of a truck for handling the load. Popular types are fork extensions, clamps, rotating devices, side shifters, load stabilizers, rams, and booms.

Brake system, parking—A means of preventing inadvertent movement of a stationary truck.

Brake system, service—The primary means of any type of brake system used for stopping and holding a truck.

Capacity—The capacity of a truck equipped with either load carriage and forks or attachments is the weight at a specified load center that a given truck can transport in a carry position and stack to the specified elevation of the load-engaging means.

Note: Capacity is used to designate the weight-handling ability of a particular truck as equipped.

Classification

Class 1 Electric motor, sit-down rider, counter-balanced truck (solid and pneumatic tires)
Class 2 Electric motor, narrow-aisle trucks (solid tires)
Class 3 Electric motor, hand trucks or hand/rider trucks (solid tires)
Class 4 Internal combustion engine trucks (solid tires)
Class 5 Internal combustion engine trucks (pneumatic tires)
Class 6 Electric and internal combustion engine tractors (solid and pneumatic tires)
Class 7 Rough-terrain forklift trucks (pneumatic tires)

Each of the different types of powered industrial trucks has its own unique characteristics and inherent hazards. To maximize effectiveness, training must address the unique characteristics of the type of vehicle(s) the employee is being trained to operate.

3.2 Terms (continued)

Forklift markers—A marker that designates the type of forklift needed for a particular hazardous location.

Forklifts for hazardous locations

- Type DS—Diesel-powered units that, in addition to all the requirements for the Type D units, are provided with additional safeguards for the exhaust, fuel, and electrical systems.
- Type DY—Diesel-powered units that have all the safeguards of the Type DS units but do not have any electrical equipment, including ignition. They are equipped with temperature-limiting features.
- Type ES—Electrically powered units that, in addition to all of the requirements for the Type E units, are provided with additional safeguards for the electrical system to prevent emission of hazardous sparks and to limit surface temperatures.
- Type EE—Electrically powered units that, in addition to all of the requirements for the Types E and ES units, have electric motors and all other electrical equipment completely enclosed.
- Type EX—Electrically powered units that differ from Types E, ES, or EE units in that the electrical fittings and equipment are designed, constructed, and assembled so that the units may be used in atmospheres containing specifically named flammable vapors, dusts, and, under certain conditions, fibers. Type EX units are specifically tested and classified for use in Class I, Group D, or in Class II, Group G, locations, as defined in NFPA 70, National Electrical Code.
- Type GS—Gasoline-powered units that, in addition to all of the requirements for the Type G units, are provided with additional safeguards for the exhaust, fuel, and electrical systems.
- Type GS/LPS—Units that operate on either gasoline or liquefied petroleum gas and, in addition to all of the requirements for the Type G/LP units (described below), are provided with additional safeguards for the exhaust, fuel, and electrical systems.
- Type LPS—Liquefied-petroleum gas-powered units that, in addition to the requirements for Type LP units, are provided with additional safeguards for the exhaust, fuel, and electrical systems.

  Note: The above units are suitable for hazardous areas because they are equipped with such safeguards as special exhaust, fuel, or electrical systems against inherent fire hazards.

Forklifts for nonhazardous locations

- Type D—Diesel-powered units having minimal acceptable safeguards against inherent fire hazards.
- Type E—Electrically powered units having minimum acceptable safeguards against inherent fire and electrical shock hazards.
- Type G—Gasoline-powered units having minimum acceptable safeguards against inherent fire hazards.
- Type LP—Liquefied-petroleum-gas-powered units having minimum acceptable safeguards against inherent fire hazards.
- Type G/LP—Units that operate on either gasoline or liquefied-petroleum gas and have minimum acceptable safeguards against inherent fire hazards.

  Note: The above units are not suitable for use in hazardous areas because they have only minimum safeguards against inherent fire hazards.

3.2 Terms (continued)

Industrial forklift truck—A high-lift truck with load carriage and forks for transporting and stacking loads. Industrial forklift trucks may be powered by gasoline, diesel fuel, batteries, or propane (LP gas).

Inspection/maintenance coordinator—A person designated by a group or division who coordinates and directs the use, inspection, and maintenance of forklifts and powered industrial trucks.

Maintenance subcontractor—A company under contract to the Laboratory to perform qualified maintenance on forklifts and powered industrial trucks.

Operator—A person who is properly trained, licensed, and authorized to use a forklift or powered industrial truck in fulfilling job requirements.

Powered industrial truck—A mobile, power-driven vehicle used to carry, push, pull, lift, or stack material (not including vehicles intended primarily for earth moving).

Proficiency instructor—A person with advanced training in safe forklift operation designated by a group leader to conduct operator proficiency (hands-on) training for forklift and powered industrial truck operators.

Removable attachment—An attachment that can be mounted on the forks or on the carriage in place of the forks by means of such conventional fasteners as bolts and pins and that does not require disassembling any other portion of the lifting system for installation or removal.

4.0 Responsibilities

4.1 Division Directors

Division directors must ensure that the requirements of this LIR are being implemented by their line organizations.

4.2 Group Leaders

Group leaders shall

- implement requirements;
- authorize candidates to be operators;
- maintain a current inventory list of all forklifts and powered industrial trucks, along with records on all maintenance, inspections, and modifications consistent with OSHA standard 29 CFR 1910.178 and ANSI/ASME B56.1;
- appoint inspection/maintenance coordinators;
- appoint a proficiency instructor;
- devise an administrative system to control and track usage of equipment by licensed and authorized personnel; and
- determine the hazard classification of any particular atmosphere or location according to ANSI/NFPA 505.

4.3 ESH-5

The Industrial Hygiene and Safety Group (ESH-5) shall

- advise and assist in developing training;
- provide to ESH-13 instructors for hands-on training of operators and proficiency instructors;
- work with Business Operations Division contract administrators to ensure that the maintenance subcontract meets the requirements of this document; and
- review the maintenance subcontract to ensure that the subcontractor is required to follow the manufacturer's recommended maintenance schedule.

4.4 Operators

The forklift and powered industrial truck operator shall

- operate *only* equipment that he/she is licensed and authorized to operate;
- perform preoperational inspections before each shift during which the vehicle is used and document the inspections with Form1568, "Inspection Checklist for Forklifts and Powered Industrial Trucks" (*http://enterprise.lanl.gov/forms/1568.pdf*); and
- operate equipment safely and within the manufacturer's guidelines and this document, with attention to maintaining the stability of the vehicle. To operate the equipment safely requires training in the factors that affect the stability of the equipment as it is being used.

  Note: Examples of these factors include

  - improper operation, faulty maintenance, or poor housekeeping;
  - ground and floor conditions, grade, speed, loading (trucks equipped with attachments behave as partially loaded trucks even when operated without a load on the attachment), batter weight, dynamic and static forces, and the judgment exercised by the operator;
  - on electric trucks, use of a battery that has a service weight within the minimum/ maximum range specified on the truck's nameplate;
  - emphasize the need for written approval from the manufacturers of the forklift who have modified any pre-designed forklift switch designs or the gripping or clamping device for the forklift;
  - special operating conditions.

    The amount of forward and rearward tilt to be used is governed by the application. Using maximum rearward tilt is allowable under certain conditions, such as traveling with the load lowered. The stability of a truck does not encompass conditions at high elevations, in which excessive tilt can occur, or the operation of trucks with excessive off-center loads.

- report all accidents involving personnel, building structures, and equipment to the supervisor or as otherwise directed.
- not add to or modify the vehicle in a manner that would change the vehicle's lift capacity without the manufacturer's approval.
- not block access to fire aisles, stairways, and fire equipment.
- not ride motorized hand trucks unless they are of the walk-ride design.
- maintain in a legible condition the capacity, operation, and maintenance instruction plates, tags, or decals provided by the manufacturer.
- be aware of hazardous conditions to protect himself/herself, other personnel, the truck, and other material.

4.4 Operators (continued)

- assess potential hazards before engaging in any material-handling activities.
- be familiar with the operation and function of all controls and instruments before using the truck.
- assist with determining the hazard classification of any particular atmosphere or location according to ANSI/NFPA 505.
- use personal restraint devices, including seat belts, if provided on the forklift or powered industrial truck.

4.5 Proficiency Instructors

Proficiency instructors shall

- ensure that operators are carefully selected, considering physical qualifications, job attitude, and aptitude.
- explain to all operators the rules and why they were formulated.
- understand the basic fundamentals of truck and component design as related to safety (for example, inches-to-pounds loading, mechanical limitations, center of gravity, and stability).
- introduce the operator to the equipment, control locations, and functions and explaining how they work when used properly and their problems when used improperly.
- supervise practice on an operating course that is remote from normal activity and is designed to simulate actual plant operations (for example, warehouse stacking and trailer loading).
- administer oral, written, and operational performance tests and evaluations during and at the completion of the course.
- periodically evaluate on-the-job operators.
- understand nameplate data, operator instructions, and warning information appearing on the truck.

4.6 Inspection/Maintenance Coordinators

Inspection/maintenance coordinators shall

- inspect forklifts and powered industrial trucks
  - before each vehicle is first used,
  - when each vehicle is reassigned,
  - after each vehicle is repaired;

- maintain an inventory list of forklifts and powered industrial trucks; and
- coordinate required maintenance.

4.7 Facility Managers

Facility managers shall ensure that forklifts and powered industrial truck activities are authorized and documented in the facility's safety plan.

5.0 Requirements

5.1 General Hazards

Forklifts and powered industrial trucks must be operated in a manner that avoids the following hazards:

- falling loads caused by overloading, unbalanced loading, or other improper loading;
- obstructions to the free passage of the load or to the operator's view in the direction of travel;
- platforms, curbs, or other surfaces, which could cause the vehicle to veer or fall;
- poor maintenance,
- driving the vehicle at excessive speed, and
- using equipment for a purpose for which it was neither intended nor designed.

5.2 Standard Controls

5.2.1 Inspections

Inspection/Maintenance Coordinator

The inspection/maintenance coordinator, or a designee, must inspect forklifts and powered trucks

- before the vehicle is first used,
- when each vehicle is reassigned, and
- after each vehicle is repaired.

The inspection/maintenance coordinator shall maintain copies of inspections and maintenance of assigned equipment.

Operator

The operator must perform and document preoperational inspections of forklifts and powered industrial trucks. These inspections shall be performed once during each shift in which the vehicle was used Form 1568, "Inspection Checklist for Forklifts and Powered Industrial Trucks," or an equivalent form provided by the operating group, must be used for this purpose.

Maintenance Subcontractor

The maintenance subcontractor must conduct and document annual inspections.

5.2.2 General Maintenance

Organizations that operate forklifts and powered industrial trucks must submit these vehicles for maintenance inspections at least annually. Defects and maintenance must be recorded on Form 1569, "Defective Equipment Report for Forklifts and Powered Industrial Trucks" (*http://enterprise.lanl.gove/forms/1569.pdf*). Maintenance must be performed by a maintenance subcontractor who is trained in maintaining forklifts and powered industrial trucks. The inspection/maintenance coordinator must maintain records for these inspections and a current inventory.

5.2.3 Maintenance Subcontractor

The maintenance subcontractor shall maintain and inspect all forklifts and powered industrial trucks in conformance with the manufacturers' and users' recommendations and shall

- follow and document a planned maintenance lubrication and inspection system;
- maintain placards for Laboratory forklifts and powered industrial trucks; and
- maintain records of Laboratory forklifts and powered industrial trucks.

Note: Copies of maintenance and annual inspection records must be forwarded to the inspection/maintenance coordinator.

Special trucks or devices designed and approved for operating in hazardous areas must receive special attention to ensure that maintenance preserves the original, approved, safe-operating features. The subcontractor must evaluate the need for and install, if feasible, personal restraint systems, including seat belts.

5.2.4 Modifications

Forklifts and powered industrial trucks must not be added to or modified in a manner that affects their capacity or safe operation without written approval from the manufacturer. Capacity, operation, and maintenance instruction plates, tags, or decals must be changed and maintained accordingly.

Note: Ask the maintenance subcontractor for instructions on filling out a new data/capacity tag.

5.2.5 Hazard Analysis

Operators must perform an assessment of potential hazards before engaging in material-handling activities. The assessment must consider site conditions, operator proficiency, and equipment capabilities.

5.3 Operator Training and Licensing

5.3.1 General Training Requirements

Group leaders must ensure that

- personnel who operate forklifts and powered industrial trucks complete the Laboratory's training program and are relicensed to operate such vehicles every 3 years and
- operators of forklifts and powered industrial trucks possess a valid motor vehicle driver's license.

5.3.1 General Training Requirements (continued)

Initial training and licensing shall consist of three steps:

- completing the Forklift Safety Fundamentals course offered by the Training Group (ESH-13),
- completing the hands-on demonstration of operator proficiency conducted by a qualified proficiency instructor, and
- completing the "Operator's License Application for Forklifts and Powered Industrial Trucks" (Form 1567, Attachment 1). The proficiency instructor must verify, by conducting a hands-on proficiency demonstration and signing the form, that the prospective operator is competent to operate the specific forklift or powered industrial truck as specified on the license.

5.3.2 License Renewal

The operator must renew his/her license within a month of the anniversary date of issue of the initial license.

Note: Renewal requirements for the 3-year and 6-year anniversary dates are slightly different. This cycle continues through all future years that the operator maintains a license.

For a 3-year anniversary renewal, the operator must

- pass the Comprehensive Fundamental Examination (test-out option) or repeat the Forklift Safety Fundamentals course, coordinated through ESH-13;
- complete a hands-on demonstration of operator proficiency conducted by a qualified proficiency instructor; and
- complete the Operators' License Application for Forklifts and Powered Industrial Trucks (Form 1567, Attachment 1).

For a 6-year anniversary renewal, the operator must

- repeat the Forklift Safety Fundamental course;
- complete a hands-on demonstration of operator proficiency conducted by a qualified proficiency instructor; and
- complete the Operators' License Application for Forklifts and Powered Industrial Trucks (Form 1567).

Note: If the license expires, the forklift operator must complete all initial training to be relicensed.

Forklift and powered industrial truck proficiency instructors must be trained and licensed by ESH-13 every 3 years. They must also maintain a valid forklift and powered industrial truck operator's license. Proficiency instructors have a dual role: they must provide on-the-job training and evaluate an operator's proficiency in operating various types of forklifts and powered industrial trucks. Additionally, proficiency instructors must be familiar with all on-site hazards of the work areas where their personnel operate.

5.4 Records

Organizations must retain inspection and maintenance records for all forklifts and powered industrial trucks for a minimum of 1 year. Records of defects and repairs must be retained for the life of the vehicle in group operating files. In addition, operating groups must maintain an equipment inventory list and a list of maintenance coordinators and proficiency instructors.

Listings of new, reassigned, and salvaged forklifts and powered industrial trucks must be maintained and kept current as part of the inventory list.

5.5 Operating Access Control Requirements

To prevent unauthorized use, forklifts and powered industrial trucks must be controlled either administratively or physically (that is, using chains and locks).

5.6 Placarding

Placards must be displayed on the left-hand side of the forklift or powered industrial truck. Operating groups shall post and maintain the following information on forklifts and powered industrial trucks:

- assigned organization, group, facility management unit;
- equipment point of contact;
- inspection/maintenance coordinator;
- annual inspection status; and
- special instructions

Note: An SOP is an example of a special instruction.

5.7 Forklifts and Powered Industrial Trucks

Using the authorized equipment in hazardous areas must be considered essential for the safety and protection of personnel and property. Forklifts and powered industrial trucks approved for use in hazardous areas must have the truck manufacturer's label or other identifying mark indicating approval for the intended use by a recognized national testing laboratory, that is, Underwriter's Laboratories (UL) or Factory Mutual (FM). Durable markers indicating the designated type of forklift or powered industrial truck for use in hazardous areas must be applied to each side of the vehicle in a visible but protected area.

6.0 References

6.1 Document Ownership

ESH-5 is the OIC for this document.

6.2 Documents

ANSI (American National Standards Institute)/ASME (American Society of Mechanical Engineers). "Safety Standard for Powered Industrial Trucks—Low-Lift and High-Lift Trucks, Section 5, ANSI/ASME B56.1, most recent edition, New York, New York.

ANSI (American National Standards Institute)/NFPA (National Fire Protection Association). "Fire Safety Standard of Powered Industrial Trucks, ANSI/NFPA 505, most recent edition, New York, New York.

OSHA (Occupational Safety and Health Administration. "DOE Hoisting Rigging Standard," Title 29, Part 1910.178, most recent edition, Washington, DC.

Los Alamos National Laboratory. "Environment, Safety, and Health Training," Administrative Requirement AR 1-4, in the Environment, Safety, and Health Manual, Chapter 1 (most recent edition).

National Fire Protection Association, "National Electrical Code," NFPA 70, most recent edition, Quincy, Massachusetts.

7.0 Attachments

Attachment 1 Application for Operator's License or Proficiency Instructor's Endorsement for Forklifts and Powered Industrial Trucks (Form 1567)
Attachment 2 Recommended Major Implementation Criteria for Self-Assessment for Forklifts and Powered Industrial Trucks

ATTACHMENT 1

APPLICATION FOR OPERATOR'S LICENSE OR PROFICIENCY INSTRUCTOR'S ENDORSEMENT FOR FORKLIFTS AND POWERED INDUSTRIAL TRUCKS
(Form 1567)

An applicant for a forklift operator's license must have a valid driver's license, must have successfully completed Forklift Safety Fundamentals (Course 753), and must have demonstrated hands-on proficiency verified by a forklift proficiency instructor. An applicant for a proficiency instructor endorsement must be designated by his/her line manager, must hold a valid forklift operator's license, and must have completed Forklift Proficiency Instructor Training (Course 12565). An applicant for an operator's license must complete Sections 1 and 2 below and attach his/her proficiency evaluation checklist. An applicant for a proficiency instructor endorsement must complete Sections 1 and 3 below and attach his/her proficiency evaluation checklist.

Section 1: Applicant Information		
Applicant's Name (Print Last, First, MI)	Applicant's Z Number	Applicant's Signature
Applicant's Group/Organization	Applicant's Mail Stop	Applicant's Telephone Number
Applicant's Driver's License Number	State/County of License Issue	Application Date
Supervisor's Name (Print Last, First, MI)	Supervisor's Z Number	Supervisor's Signature
Supervisor's Group/Organization	Supervisor's Mail Stop	Supervisor's Telephone Number

Section 2: Forklift Operator Hands-On Proficiency

This applicant, as verified by the attached proficiency evaluation checklist, has successfully demonstrated hands-on proficiency, can drive the equipment satisfactorily, and knows how to operate the following equipment safely. (Check all that apply.)

Forklift Truck: 3.5 Tons Maximum
Forklift Truck: 10 Tons Maximum
Forklift Truck: Over 10 Tons (Specify Tons: _____)
Tow Tractor
Motorized Hand Truck
Other (Specify_____)

Proficiency Instructor's Name (L, F, MI)	Proficiency Instructor's Z Number	Proficiency Instructor's Signature
Proficiency Instructor's Telephone Number	Proficiency Instructor's Mail Stop	Date of Proficiency Evaluation

Section 3: Forklift Proficiency Instructor Endorsement

This applicant, as verified by the attached proficiency evaluation checklist, has successfully completed forklift proficiency instructor training and demonstrated proper use of the evaluation checklist for operations.

Course Instructor's Name (Print Last, First, MI)	Course Instructor's Signature
Course Instructor's Z Number	Date of Proficiency Instructor Training

Section 4: Records Verification

Forklift Safety Fundamentals Course Date_____ month year	Operator's License Expiration Date _____ month year	Issuer's Name (Print Last, First, MI)
Endorsement requires current status in Forklift Operator Training Plan #121 Yes No	Proficiency Instructor Expiration Date_____ month year	Issuer's Signature

Form 1567 (7/99) (LIR 402-1110-01.1) (ESH-5, OIC)

ATTACHMENT 2
(Guidance)

RECOMMENDED MAJOR IMPLEMENTATION CRITERIA FOR SELF-ASSESSMENT

(Non Mandatory)

LIR Title	LIR Number
FORKLIFTS AND POWERED INDUSTRIAL TRUCKS	LIR 402-1110-01.1

The major implementation criteria listed below are provided to assist Laboratory organizations assess their implementation of this LIR. These criteria provide an objective basis for self-assessing implementation of the major requirements contained in the LIR. The LIR also states requirements for other areas, such as scope, precautions, and responsibilities which, when applied, complement the successful implementation of these major requirements.

1. **The most important criterion for assessing the implementation status of this LIR should be, if applicable: Have the requirements contained in the LIR been communicated to the individual(s) responsible for performing the work?**

2. **In addition, the recommended major implementation criteria for self-assessment of this LIR are**

   - Has an inspection/maintenance coordinator been assigned?
   - Has a proficiency instructor been assigned to the group?
   - Have operators been trained and do they possess a current license?
   - Is forklift use controlled by a positive means to prevent unauthorized usage?
   - Are inspection and maintenance for the forklift current?
   - Has the forklift been modified in accordance with the requirements of this LIR?
   - Does the operator perform a hazard analysis before engaging in material-handling activities for his/her respective areas?
   - Is the forklift currently placarded with accurate information?